

# Math 200 – Homework 10

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This assignment is due on **Friday, April 28, 2017** at 9:50 AM.

**Reading:** Sections 9.1 (ignore example 5), 9.2 (ignore examples 5 and 6), 9.3 (ignore examples 4 and 5). By the way, did you know that Prof. Aldous on page 518 on the textbook was my Probability professor at UC Berkeley? Some people call him the greatest probabilist of all time!

- **Section 9.1:** 10, 19
- **Section 9.2:** 7, 13, 22, 32, 39, AP
- **Section 9.3:** 8, 24

**Additional Problem:** Suppose  $f$  is a function from  $\{1, 2, \dots, n\}$  to  $\{1, 2, \dots, n\}$ . What is the probability that it is one-to-one?

**Hint:** To count the total number of functions, think of it as PIN-problem with  $n$  (input) slots, with (output) digits from  $\{1, \dots, n\}$ . To find the number of one-to-one functions, this time don't allow for repeated digits (because you want all the outputs to be distinct). (Aside: Note that when  $n$  goes to  $\infty$ , your probability goes to 0, which means that it's practically impossible for a function from  $\mathbb{Z}^+$  to  $\mathbb{Z}^+$  to be one-to-one)